

REMARKS

Applicant appreciates Examiner's thorough review of the Application and the indicated allowability of Claims 13-14, 17, 24, 28-30, 43, and 44. Reconsideration and allowance are respectfully requested.

The replacement drawing sheet overcomes the Examiner's objection to the drawings. Regarding the objection to Claim 5 found on Page 3 of the Office Action, in fact opaque objects can be photoelastic. An object is typically considered opaque if it does not visibly transmit light. An object may transmit a small amount of light and still be defined as opaque. Some objects that have traditionally been considered opaque have been discovered to have the property of photoelasticity. This means that they are capable of transmitting some amount of light, yet they are still considered to be opaque.

By this amendment, Claims 6, 13-14, 17, 24, 26, 28-30, and 43 are amended. No new matter has been added by the amendments. Claim 26 has been amended to correct the informality noted by the Examiner and overcome the 35 U.S.C. 112, second paragraph rejection noted on Page 3 of the Office Action. Claim 6 has been amended for clarity. Claims 17 and 24 have been amended to place them in independent form and Claims 13-14, 28-30, and 43 have been amended to depend from patentable Claim 17. Claims 13-14, 17, 24, 28-30, and 43-44 are in condition for allowance.

Claims 1-45 are pending in the application, including independent Claim 1.

Claims 1-2, 5, 9, 26, 38-39, and 42 are patentable under 35 U.S.C. 102(b) over Peiperl (U.S. Serial No. 3,927,461).

For an invention to be anticipated, it must be demonstrated that each and every element of the claimed invention is present in the "four corners" of a single prior art, either expressly described therein or under the principle of inherency. Lewmar Marine Inc. v Barient Inc., 3 USPQ2d 1766, 1767-1768 (Fed. Cir. 1987) (emphasis added). The absence from a prior art reference of any claimed element negates anticipation. Kloster Speedsteel AB v. Crucible, Inc., 230 USPQ 81, 84 (Fed. Cir. 1986).

Independent Claim 1

Peiperl '461 teaches upright polarizing sheets on either side of a birefringent material treated with water spray and heat. Independent Claim 1 differs from Peiperl at least in that it teaches a deformable photoelastic material. Peiperl does not teach or suggest this feature. Peiperl teaches the use of birefringent materials, not a deformable photoelastic material. Many materials exhibit birefringence but do not create photoelastic fringes under stress.

Because Peiperl fails to teach each and every element of Claim 1, the rejection of Claim 1 under 35 U.S.C. 102(b) is improper and should be withdrawn.

Dependent Claims 2, 5, 9, 26, 38-39, and 42

Dependent Claims 2, 5, 9, 26, 38-39, and 42 depend from and share the patentable features of Claim 1 and add further patentable limitations. Examples are given below.

Claim 5

Claim 5 adds that the photoelastic material is opaque. Peiperl does not teach or suggest this feature. Examiner does not argue otherwise.

Claim 9

Claim 9 adds that the photoelastic material is a single color. Peiperl does not teach or suggest this feature. Examiner argues that "as Peiperl mentions color only in the context of birefringence, the material itself is monochromatic." In other words, the Examiner asserts that Peiperl does not teach any particular color or colors for its birefringent object and therefore the birefringent object is monochromatic. However, a failure to teach anything regarding color cannot be taken as a teaching of a particular color. A reference cannot teach a claimed limitation by silence, but only by affirmative textual teachings. A claimed limitation must be either directly taught or inherently present (for example, MPEP §706.02(IV)). Here, a single color is neither directly taught nor inherent. If silence could anticipate a claimed invention, every invention could be rejected over a blank sheet of paper.

Claim 26

Claim 26 adds that additional optical effects are used. Peiperl does not teach or suggest this feature. Examiner cites element 11 of Figure 1 of Peiperl as teaching this limitation. However, element 11 of Figure 1 of Peiperl is a turntable. Applicant requests that the Examiner explain how a turntable is an additional optical effect.

Claim 38

Claim 38 adds an opaque object or a mirrored surface below, a characteristic of, or embedded within the transparent or translucent photoelastic material. Peiperl does not teach or suggest this feature. Examiner again cites to turntable 11 of Peiperl as teaching this feature. While the turntable 11 is below the birefringent object, Peiperl does not specify that it is opaque. Therefore Claim 38 has an additional limitation not shared by Peiperl.

Therefore Peiperl fails to teach each and every element of each of the claims. For at least the reasons given above, the rejection of Claims 1-2, 5, 9, 26, 38-39, and 42 under 35 U.S.C. 102(b) over Peiperl is improper and should be withdrawn.

Claims 3-4, 6-8, 15, and 40 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Lane et al. (U.S. Serial No. 3,315,391).

"To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) (emphasis added).

Lane teaches a display device designed to show animation (Col. 1:10-12). The device operates by placing a formed material between a fixed and rotary analyzer producing polarized

light (1:67-2:1).

Dependent Claims 3-4, 6-8, 15, and 40 depend from and share the patentable features of Claim 1 and add further patentable limitations. Examples are given below.

Claim 6

Claim 6 adds that different regions of the photoelastic material differ in the amount of light they transmit. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach this limitation, cites to Lane as teaching this element. However, the lines cited to by the Examiner state only that there is a "form desired to be portrayed formed within a sheet of relatively inexpensive, transparent to translucent plastic material." This means that the material is transparent, translucent, or in between. It says nothing regarding different regions of a deformable photoelastic material. Typically a material is of a consistent transparency.

Furthermore, the Examiner's motivation for a combination of Lane and Peiperl is not found in the prior art.

Claim 7

Claim 7 adds that the chemical composition of the photoelastic material is variable as long as the material is photoelastic. No reference teaches or suggests this feature. The Examiner cites to Peiperl as teaching this limitation. However, the cited lines of Peiperl have nothing to do with varying chemical composition. They refer only to the use of an appropriate birefringent material. A limitation cannot be taught by silence.

Claim 8

Claim 8 adds that the modulus of elasticity is variable. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Lane. However, the lines cited to in Lane merely state three preferred materials with which to work. These lines have nothing to do with a variable modulus of elasticity. Lane does not teach or suggest using the two or more materials together and in fact the document strongly suggests the use of only one material.

Claim 15

Claim 15 adds that the shape is a prism, lens, or wedge for creating various optical effects. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to element 12 of Lane. However, element 12 of Lane is rectangular shaped protrusions (4:68) and not a prism, lens, or wedge for creating various optical effects. Furthermore, the motivation supplied by the Examiner for the combination of Lane with Peiperl is not found in the prior art and is also nonsensical. How does a prism, lens, or wedge cheaply create illusory movement?

Claim 40

Claim 40 depends from Claim 39 and adds multiple polarizing films rotated with respect to one another to control transmission of light. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Lane as teaching this feature. However, there would be

no motivation for such a combination, considering that Peiperl employs a turntable and would have no need for the illusion of motion when its birefringent object actually moves.

Therefore the references fail to teach or suggest all the claim limitations of each of the claims. For at least the reasons given above, the rejection of Claims 3-4, 6-8, 15, and 40 under 35 U.S.C. 103(a) over Peiperl in view of Lane is improper and should be withdrawn.

Claims 10, 16, and 20 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Burchell (U.S. Serial No. 2,473,857).

Burchell teaches a device for providing views of specific hues whose saturation varies without change in hue (Col. 1:10-13). The device operates by placing a sheet of non-polarizing material 12 and applied birefringent material 13 between sheets 11, 14 of polarizing material and translucent sheet 10 (1:51-2:37, 3:61-62). The material 12 is divided into different areas with differently colored translucent filters applied to each and birefringent material applied to the back of each (2:6-37). The birefringent material is applied in each color zone in side by side sections having progressively different angles of orientation of their significant axis (3:44-49). This progressive change in angle of orientation of the birefringent strips in each zone results in an optical effect, primarily a progressive variation in color saturation in each zone (4:11-15).

Dependent Claims 10, 16, and 20 depend from and share the patentable features of Claim 1 and add further patentable limitations. Examples are given below.

Claim 10

Claim 10 adds that the photoelastic material is different colors in different regions. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Burchell as teaching this feature. However, the material 12 cited to by the Examiner is not different colors in different regions. Different colored filters may be applied to its surface.

Claim 16

Claim 16 adds that the one or more polarizing films are attached on one or more outer surfaces on the photoelastic material. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Burchell as teaching this feature. Burchell teaches a polarizing sheet that is not attached to photoelastic material. There would also be no motivation for modification of Peiperl as suggested by the Examiner, because the birefringent material of Peiperl could not be rotated on a turntable effectively if it was attached to a polarizing film.

Claim 20

Claim 20 adds that the one or more polarizing films are disposed on individual stands for flexibility in viewing. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Burchell as teaching this feature. However, the lines in Burchell cited to by the Examiner have nothing to do with stands, but rather teach frames carried by grooved rollers that rotate the sheet 14. Furthermore, no

motivation is found in the prior art for the modification of Peiperl as suggested by the Examiner. Allowing the films to rotate separately would not be advantageous for Peiperl.

Therefore the references fail to teach or suggest all the claim limitations of each of the claims. For at least the reasons given above, the rejection of Claims 10, 16, and 20 under 35 U.S.C. 103(a) over Peiperl in view of Burchell is improper and should be withdrawn.

Claims 11-12 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of WR#1.

WR#1 is an internet advertisement for magnetic letters. WR#1 is not analogous art and cannot render the present invention obvious because it is neither in the field of Applicant's endeavor, nor reasonably pertinent to the particular problem with which the applicant was concerned. WR#1 should be removed as a reference. WR#1 is magnetic letters, which is not in the field of Applicant's endeavor and is entirely unrelated technology.

Furthermore, WR#1 is not reasonably pertinent to the particular problem faced by Applicant. The particular problem solved by the present application is the lack of "toys and entertainment devices that amuse as well as to stimulate an interest in science and engineering in children and adults." (Background) WR#1 is not reasonably pertinent to that problem because it does not, because of the matter with which it deals, logically commend itself to an inventor's attention in considering this problem. See Wang Laboratories Inc. v. Toshiba Corp., 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993).

WR#1 solves the problem of providing magnetic letters that stick to refrigerators and help

preschoolers learn letter recognition and the fundamentals of reading. It has nothing to do with photoelasticity, deformable photoelastic devices, or stimulating an interest in science. No inventor would think to look to WR#1 for the solution to the problem of a lack of toys and entertainment devices that amuse as well as to stimulate an interest in science and engineering.

Because WR#1 is neither in the field of Applicant's endeavor, nor reasonably pertinent to the particular problem with which the applicant was concerned, it is non-analogous art and should be removed as a reference.

Dependent Claims 11-12 depend from and share the patentable features of Claim 1 and add further patentable limitations. Examples are given below.

Claim 11

Claim 11 adds one or more magnets embedded in the photoelastic material. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to WR#1 as teaching this feature. However, WR#1 teaches magnetic letters. It does not teach one or more magnets embedded in photoelastic material. Furthermore, the Examiner has not provided a motivation to modify Peiperl by adding magnets. No such motivation is found in the prior art.

Claim 12

Claim 12 depends from Claim 11 and adds that the magnets create stress in the photoelastic materials and cause individual shapes to attract or repel one another. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest

this limitation, cites to WR#1 as teaching this feature. However, WR#1 does not teach or suggest this feature. It is not an inherent property of embedding one object into another to create stress.

Therefore the references fail to teach or suggest all the claim limitations of each of the claims. For at least the reasons given above, the rejection of Claims 11-12 under 35 U.S.C. 103(a) over Peiperl in view of WR#1 is improper and should be withdrawn.

Claims 18-19, 27, and 34-35 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Cotterman (U.S. Invention Registration H76).

Cotterman teaches an instructional polariscope that can be disassembled and reassembled. Dependent Claims 18-19, 27, and 34-35 depend from and share the patentable features of Claim 1 and add further patentable limitations. Examples are given below.

Claim 18

Claim 18 adds that the one or more polarizing films are separated and supported by posts disposed between the films. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Cotterman as teaching this feature. However, the elements cited to by the Examiner as posts do not separate polarizing films and are not disposed between polarizing films. Comparison of Cotterman with Figure 8 of the present Application makes the distinction clear.

Claim 34

Claim 34 adds that a sharp object is used to create stress patterns by contacting the photoelastic material. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Cotterman as teaching this feature. The Examiner argues that "cause a concentrated load to be applied" is the same as "a sharp object is used to create stress patterns." This is incorrect. Cotterman does not teach a sharp object. Without teaching a sharp object, Cotterman cannot teach or suggest that a sharp object is used to create stress patterns by contacting the photoelastic material.

Claim 35

Claim 35 depends from Claim 34 and adds a separate lens used to view stress patterns. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Cotterman as teaching this feature. However, the element 26 cited to by the Examiner is a quarter wave plate lens and not a separate lens for viewing stress patterns.

Therefore the references fail to teach or suggest all the claim limitations of each of the claims. For at least the reasons given above, the rejection of Claims 18-19, 27, and 34-35 under 35 U.S.C. 103(a) over Peiperl in view of Cotterman is improper and should be withdrawn.

Claims 21, 22, and 45 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Hester, III et al. (U.S. Serial No. 5,327,180).

Hester teaches a pair of glasses with polarized lenses. Dependent Claims 21, 22, and 45 depend from and share the patentable features of Claim 1 and add further patentable limitations. Examples are given below.

Claim 21

Claim 21 adds a polarized light source for passing light through the photoelastic material and then through a pair of polarized glasses. No reference teaches or suggests this feature. The Examiner cites Peiperl as teaching a polarized light source. The Examiner argues that "combined elements 14 and 16" are a polarized light source. This is incorrect. Elements 14 and 16 are a polarizing sheet and a light source, respectively.

Claim 45

Claim 45 adds that transparent or translucent protective coatings are applied over outer surfaces of the photoelastic material. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Hester as teaching this feature. However, Hester does not teach photoelastic material at all and has nothing to do with photoelasticity. Therefore, it cannot teach that transparent or translucent protective coatings are applied over outer surfaces of the photoelastic material.

Therefore the references fail to teach or suggest all the claim limitations of each of the

claims. For at least the reasons given above, the rejection of Claims 21-22 and 45 under 35 U.S.C. 103(a) over Peiperl in view of Hester is improper and should be withdrawn.

Claim 23 is patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Carranza (U.S. Serial No. 2,423,371).

Carranza teaches a polartoscope, which is a kaleidoscope utilizing polarized light (1:2-5). It does nothing to teach what Peiperl lacks. Dependent Claim 23 depends from and shares the patentable features of Claim 1 and add further patentable limitations. Claim 23 adds that the one or more polarized films are Polaroid films rotated with respect to one another for increasing or decreasing the amount of light passing through the photoelastic object. No reference teaches or suggests this feature. Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Carranza as teaching this feature. However, no motivation for modifying Peiperl as proposed by the Examiner is found in the prior art. In addition, there would be no reason to rotate the polarizing sheets of Peiperl.

Therefore the references fail to teach or suggest all the claim limitations of Claim 23. For at least the reasons given above, the rejection of Claim 23 under 35 U.S.C. 103(a) over Peiperl in view of Carranza is improper and should be withdrawn.

Claim 25 is patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Blazey et al. (U.S. Serial No. 5,466,564).

Blazey teaches photographic optical system for eliminating non-contact interference fringes in a photographic film (Asbtract). Dependent Claim 25 depends from and shares the

patentable features of Claim 1 and adds further patentable limitations. Claim 25 adds that a thin air interface between embedded objects and the photoelastic material creates interference patterns of light. No reference teaches or suggests this feature. It is not clear what the Examiner's position is, as he has not alleged that this feature is taught by any reference. However, Peiperl cannot teach or suggest this limitation, as it does not teach embedded objects. The lines in Blazey cited to by the Examiner do not teach this either. Furthermore, Blazey is not analogous art and should be removed as a reference.

Therefore the references fail to teach or suggest all the claim limitations of Claim 25. For at least the reasons given above, the rejection of Claim 25 under 35 U.S.C. 103(a) over Peiperl in view of Blazey is improper and should be withdrawn.

Claims 31-32 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Frocht (U.S. Serial No. 3,927,461).

Dependent Claims 31-32 depend from and share the patentable features of Claim 1 and adds further patentable limitations. For example, Claim 32 adds that combinations of manual manipulation, springs, strings, elastic bands, clamps, and force-applying devices are used to affect stress patterns. Frocht only teaches the use of compression bars.

The references fail to teach or suggest all the claim limitations of Claims 31-32. For at least the reasons given above, the rejection of Claims 31-32 under 35 U.S.C. 103(a) over Peiperl in view of Frocht is improper and should be withdrawn.

Claims 36-37 are patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Zandman (U.S. Serial No. 3,187,623).

Zandman is a method of model photoelasticity analysis for stress analysis of work pieces. A photoelastic model is made to represent a work piece and subjected to stress while viewed through a polarizing lens. There would be no motivation to combine Zandman and Peiperl, as Peiperl has nothing to do with stress analysis. There would be no motivation for modifying Peiperl as proposed by the Examiner. A photoelastic coating would completely change Peiperl and would not be beneficial. Dependent Claims 36-37 depend from and share the patentable features of Claim 1 and adds further patentable limitations.

For example, Claim 36 adds an applied photoelastic coating. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Zandman as teaching this feature. However, the lines cited to by the Examiner do not relate to an applied photoelastic coating. Rather, they teach that a photoelastic element can be bonded to an adjacent material using adhesive.

Claim 37 depends from Claim 36 and adds that the photoelastic coating is a liquid paint coating or a flexible sheet coating. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Zandman as teaching this feature. However, the lines in Zandman cited to by the Examiner say nothing about paint or a flexible sheet.

The references fail to teach or suggest all the claim limitations of Claims 36-37. For at least the reasons given above, the rejection of Claims 31-32 under 35 U.S.C. 103(a) over Peiperl in view of Zandman is improper and should be withdrawn.

Claim 41 is patentable under 35 U.S.C. 103(a) over Peiperl (U.S. Serial No. 3,927,461) in view of Peiperl (U.S. Serial No. 5,172,270).

Peiperl '270 teaches a kaleidoscope utilizing birefringent material in liquid (Abstract). It has nothing to do with photoelasticity. There would be no motivation to combine Peiperl '270 with Peiperl because they are two entirely different devices, one a kaleidoscope and one not. There would be no motivation to modify Peiperl by adding the mirror of Peiperl '270 because Peiperl is not a kaleidoscope. No motivation for such a modification is found in the prior art.

Dependent Claim 41 depends from and shares the patentable features of Claim 1 and adds further patentable limitations. Claim 41 adds a mirrored surface, wherein the photoelastic material is manipulated between the mirrored surface and a polarized film. No reference teaches or suggests this feature. The Examiner, allowing that Peiperl does not teach or suggest this limitation, cites to Peiperl '270 as teaching this feature. However, Peiperl '270 does not teach manipulation of photoelastic material.

The references fail to teach or suggest all the claim limitations of Claim 41. For at least the reasons given above, the rejection of Claim 41 under 35 U.S.C. 103(a) over Peiperl in view of Peiperl '270 is improper and should be withdrawn.

CONCLUSION

Reconsiderations and Allowance are requested.

Respectfully,



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In the Drawings:

Kindly accept and enter the attached replacement drawing sheet.